

# Prevalence of Progressive Periodontal Disease in the Population of Zagreb

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## Summary

*Epidemiological research of periodontal disease indicates the prevalence of special forms of progressive periodontal diseases, juvenile and rapidly progressive periodontitis. These diseases start in early adolescence, therefore need to be diagnosed early and adequately treated.*

*We examined by CPITN the prevalence of juvenile and rapidly progressive periodontitis in 1202 subjects (who were adequate for our purpose). They were all residents of the city of Zagreb. Also we compared the relationship of progressive forms of periodontal destruction with some other forms of periodontal disease. The subjects were school children, workers and clerks, divided in to age groups 15-19, 20-24, 25-29, 30-34, 35-44, 45-54 and >55. For periodontal status evaluation we used the CPITN-community periodontal index of treatment requirements. The index consisted of the mean number of sextants of the population with sulcus bleeding, calculus, shallow and deep pockets. Additional criteria for evaluation of progressive forms of periodontal disease by use of CPITN was based upon more intensive inflammatory symptoms on the gingiva, active and deep periodontal pockets and removable dentures.*

*After statistical analysis the results of the STATJOB programme revealed that the prevalence of progressive periodontitis in Zagreb was 4.1% ( 0.6% for the juvenile form and 3.5% for the rapid form). The incidence of gingivitis, the initial form of the periodontal disease, was much greater, in youngsters 82%, and the incidence of periodontal disease in adults was also high, 80%.*

*Furthermore, the incidence of some forms of periodontal destruction was also tested. The percentage of subjects with deep periodontal pockets in juvenile and rapid periodontitis was 87.7%, and in adults periodontitis 9.5%, which indicates more severe forms of periodontal destruction in the group with juvenile and rapidly progressive periodontitis.*

*The use of CPITN was an orientational method that showed us the prevalence of the tested forms and the treatment needs. In this way we separated from the population cases with progressive periodontitis that need further clinical tests and adequate therapy.*

*Key words: prevalence, juvenile periodontitis, rapidly progressive periodontitis.*

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## Introduction

Epidemiological studies of periodontal disease show that in many countries periodontitis is a widely spread disease that shows different forms of development.

The most common method of for screening is CPITN .

The use of CPITN for epidemiological studies also allows evaluation of the severity of periodontal disease according to pocketing and clinical attachment loss (2). Baelum 1995(3) studied the relationship between CPITN and attachment loss in a rural population in Kenya in 1131 subjects.

Sulcus bleeding, calculus, pocket depths were determined by CPITN, after which attachment loss was determined.

In most cases subjects with CPITN  $\leq 1$  had no attachment loss  $\geq 4$ mm. Subjects at the age of 40 and over with CPITN 2 had in over 90% of cases attachment loss  $\geq 4$ mm, and over 50% of those who were 50 years old with CPITN 2 had attachment loss  $\geq 6$ .

About 20% of subjects between 15-29 years with CPITN 3 had attachment loss  $\geq 6$ mm.

Comparative findings of CPITN and attachment loss were not coordinated because in younger subjects the obtained results were overestimated, and in olders subjects underestimated.

In 1991 Mengel and collaborators tested periodontal status in the population sample of Jemen by CPITN and clinical attachment level. The results show that only 7% of young subjects between 15-19 had healthy periodontium (CPITN 0), while 86% had clinical signs of gingivitis and calculus (CPITN 1+2). In the age group between 35-44 only 2% were periodontally healthy, while 85 % had plaque retention and shallow pockets (CPITN 2+3), and 13% deep pockets.

The overall accepted opinion is that the degree of periodontal disease is higher in the population of Kenya and China in comparison to the populations of Norway and the USA. The study showed that attachment loss was similar in the populations of young adults in the USA, Kenya and China. However younger tested Americans had higher

greater attachment loss, and the older subjects less attachment loss in comparison to subjects from Kenya and China (5).

The registration of rapidly progressive and juvenile periodontitis is a special problem and we therefore tried to register these forms of periodontal diseases by means of CPITN.

The classification of destructive forms of periodontitis is based upon differences in the degree of destruction of periodontal tissue and upon the age, according to Bear's criteria (6).

Localized juvenile periodontitis (LJP) is a destructive form of inflammatory periodontal disease that starts in puberty. The etiopathogenesis of the disease has not been solved. However, it is known that neutrophils play an important role in the onset and progression of the disease. In 70% of people with LJP there is impaired function of neutrophils, such as lowered chemotaxis and phagocytosis (7,8).

Investigating the function of fibroblasts and collagen activity in adults with juvenile and rapidly progressive periodontitis it was found that the collagen activity of gingival fibroblasts was significantly lower than in healthy subjects (9).

Pathogenic microorganisms have an important role in the onset and progression of juvenile periodontitis. Thus *Actinobacillus actinomycetemcomitans* (Aa) is thought to be the primary etiologic factor in the onset of the disease. This gram negative anaerobic microorganism is found more often and in greater numbers in patients with juvenile periodontitis than in other forms (10,11).

Rapidly progressive periodontitis (RPP) is a disease that can start in the young, but is often diagnosed later in adults. No doubt it is connected with risk organisms that have specific destructive potential to destroy the supportive tissue of the tooth, resulting in tooth loss.

Recent studies investigated microbial factors in RPP. The most prevalent microorganisms responsible for the onset and progression of periodontal disease are: *Actinobacillus actinomycetemcomitans*, *Porphyromonas gingivalis*, *Prevotella intermedia*, *Bacteroides forsythus*, *Fusobacterium nucleatum* and the spirochets (12).

The aim of this study was to investigate the prevalence and treatment needs for juvenile and rapidly progressive periodontitis with CPITN.

### Materials and methods

The study was performed during 1986 and included, 1202 subjects from the Zagreb region. The subjects were school children, workers and clerks, divided in to age groups 15-19, 20-24, 25-29, 30-34, 35-44, 45-54 and >55.

The sample evaluation of the population of Zagreb was determined by an earlier pilot study of regions in the Republic of Croatia (13). The adequate sample of Zagreb was 1202 subjects (14).

For periodontal status valuation we used the CPITN- community periodontal index of treatment need. The index consists of the mean number of sextants of the population with sulcus bleeding, calculus, shallow and deep pockets.

The prevalence of progressive forms of periodontal disease by use of CPITN was based upon more intensive inflammatory symptoms, activity and pocket depth and inovable dentures in younger adults.

CPITN probe was used for probing and the following criteria:

- 0 = healthy periodontal tissue
- 1 = bleeding after carefully probing
- 2 = supra or subgingival calculus or iatrogenic injured marginal gingiva
- 3 = pocket 4-5mm
- 4 = pocket of 6mm or more

The level of periodontal disease and treatment requirements for the tested population was valued by CPITN on representative teeth 17,16, 21,26, 27, 36,37, 31, 46,47 in each sextant in subjects with gingival bleeding, calculus, shallow or deep periodontal pockets.

- Degree 0 no need for treatment
- 1 instructions for regular oral hygiene
- 2 and 3 scaling and root planning
- 4 complex periodontal treatment

The statistical analysis was performed with STATJOB (15) special programme performed by the University Computer Centre of Zagreb (15).

### Results

In the tested group there were 1202 subjects grouped according age and the form of periodontal disease (Table 1 and 2).

The relations between the level of periodontal disease, sulcus bleeding, calculus, shallow and deep pockets according to age, as well as different forms of juvenile and rapidly progressive periodontitis and adult periodontitis are shown in figures.

*Figure 1.* Intensity of periodontal disease in the tested population by sextants

shows that the mean number of sextants with bleeding is the highest in the age group 15-19 (5.9), and in the older age groups is lower because of other symptoms of periodontal disease. This indicates that less intensive forms of the disease are expressed in the young age groups.

*Figure 2.* The extent of periodontal disease is shown as the percentage of subjects in which the level of periodontal disease ( bleeding, calculus, shallow and deep periodontal pockets) is registered as the maximal value.

Bleeding and calculus as the first symptoms of periodontal disease-gingivitis in the youngest age group was 82%.

Periodontitis was 60% in the age group 35-44, and in the older age group to 80%.

*Figure 3.* shows treatment need for periodontal disease. The percentage of subjects who need oral hygiene instructions was 99.5%. 98.8% of subjects needed prophylaxis, and 12.7% specialist treatment.

*Figure 4.* The intensity of progressive periodontal disease by sextants shows that the mean number of sextants with bleeding in subjects with juvenile and rapid periodontitis was 5.7, while in subjects with adult periodontitis it was 5.3.

The analysis of variance and t-test showed that there was no significant differences ( $p < 0.005$ ) initially between the groups with juvenile and rapid periodontitis in contrast to adult periodontitis.

The mean number of sextants with calculus in juvenile and rapidly progressive periodontitis was 5.7, while in adult periodontitis it was 5.

Analysis of variance and t-test showed significant differences ( $p < 0.005$ ) in dental calculus

between the groups. This result indicates a more severe form of chronic inflammation in juvenile and rapidly progressive periodontitis.

The mean number of sextants per person for juvenile and rapidly progressive periodontitis with shallow pockets was 5, and with deep pockets 2.3.

In subjects with adult periodontitis the mean number of sextants with shallow pockets was 1.67 and deep pockets 0.13. Analysis of variance and t-test showed significant differences ( $p < 0.005$ ) between the tested groups.

Figure 5 shows the prevalence of progressive forms of periodontal diseases. The percentage of subjects with shallow periodontal pockets in groups with juvenile and rapidly progressive periodontitis was 12.2%, which was lower in comparison to shallow pockets in adult periodontitis 4.6%.

The highest level of periodontal destruction according to the percentage of subjects with deep periodontal pockets was 87.8% in juvenile and rapidly progressive periodontitis, and only 9.5% in adult periodontitis. Analysis of variance and t-test showed a significant difference ( $p < 0.005$ ) between the tested groups.

Figure 6. Treatment needs for progressive periodontitis showed that all subjects needed oral health education.

All subjects with juvenile and rapidly progressive periodontitis needed prophylaxis and elimination of calculus and 87.7% of subjects needed specialist treatment of the periodont.

Results obtained by statistical analysis showed that in the Zagreb region the prevalence of juvenile periodontitis was 0.6% and rapidly progressive periodontitis 3.5%.

The prevalence of gingivitis as an initial form of the periodontal disease was much higher and was 82% in younger subjects, and the prevalence of periodontitis in adults was also high, 80% (Figure 7).

## Discussion

Contemporary epidemiologic studies in the world have been directed towards investigating periodontal status, the prevalence of periodontal diseases and their early detection.

A special problem in these studies is the detection of destructive forms in young subjects. The course of their progression is fast, and early detection of these forms is necessary.

In addition, it is important to detect the risk signs for periodontal disease in some subjects or groups. The prevalence of destructive forms of periodontitis can vary between 7-15% depending on the population (16).

In this epidemiologic survey, carried out on a sample of 1202 residents of Zagreb, the prevalence of juvenile and rapidly progressive periodontitis was examined by means of CPITN. The obtained results showed that the prevalence of juvenile periodontitis was 0.6% and the prevalence of rapidly progressive periodontitis 3.5%.

Similar epidemiologic data were obtained by Kronauer in Switzerland (17).

By testing subjects aged 16, selected according to clinical criteria and X-rays, Kronauer found that the prevalence of juvenile periodontitis in Switzerland was 0.1%.

Evaluation of the degree of periodontal destruction revealed that the level of periodontal attachment loss can indicate disease severity (18).

In 1989 Van der Velden (11) used this method on school children in Amsterdam, according to age, periodontal pocket probing and clinical attachment loss and found that the prevalence of children with attachment loss of 5-8 mm was 7% for the first molar and all incisors. These results were compared with Burmeister's finding in 1984 (19) on the prevalence of juvenile periodontitis amounting to 0.1%-0.2% in a young population of Amsterdam.

Since CPITN is a partial index for registration of the mode of periodontal treatment for a certain population on the basis of periodontal changes of some teeth in a sextant, it should be pointed out that the valuation of the mean level of intensity of periodontal disease can be well represented (20).

In this way some risk cases of periodontal disease can be separated from the population and put into further clinical investigations and treatment need.

By this retrospective epidemiologic study risk forms of periodontitis were registered.

The study was continued although but under difficult war conditions. The results will be compared and shown in a form of a longitudinal study.

### Conclusion

By the use of CPITN - community periodontal index of treatment need - the prevalence and need for treatment was determined on 1202 subjects in the Zagreb region.

The investigation included age groups from 15-50 years. Persons with rapidly progressive destruction of the periodontium according to age, more severe intensity of the inflammatory changes of the periodontium, more active and deeper pockets and teeth mobility were registered separately..

In the tested group in the Zagreb area the number of subjects with juvenile and rapidly progressive periodontitis was 49, or 4.1%.

The percentage of subjects with gingivitis was more prevalent in young subjects and amounted to 82%.

The percentage of subjects with shallow and deep periodontal pockets, representing periodontal destruction, increases with age and in older subjects was to 80%.

Further more, we compared different types of periodontal disease according to the degree of periodontal destruction. Thus, the percentage of subjects with shallow pockets in adult periodontitis was 46%, and deep pockets 9.5%. In persons with juvenile and rapidly progressive periodontitis the percentage with shallow pockets was 12.2%, and with deep pockets 87.7%.

Differences in need and kind of periodontal treatment were established. All the patients needed information about their disease and instructions in oral hygiene, and prophylaxis in almost 100%. 9.5% of subjects with adult periodontitis and 87.7% of subjects with juvenile and rapidly progressive periodontitis need specialist treatment.

It can be concluded that the prevalence of progressive forms of periodontitis it are connected with youth and that their incidence in the population is important. Also it should be diagnosed and promptly treated early.